

EXPEDITED RULE MAKING

CR-105 (June 2004) (Implements RCW 34.05.353) EXPEDITED RULE MAKING ONLY

1889	
Agency: State Building Code Council	
Title of rule and other identifying information: (Describe Subject)	
Editorial changes to WAC 51-11C, 2012 Washington State Energy Code	- Commercial
NOTICE	=
THIS RULE IS BEING PROPOSED UNDER AN EXPEDITED RUI	
NEED FOR THE AGENCY TO HOLD PUBLIC HEARINGS, PREF STATEMENT, OR PROVIDE RESPONSES TO THE CRITERIA F OBJECT TO THIS USE OF THE EXPEDITED RULE-MAKING PR	PARE A SMALL BUSINESS ECONOMIC IMPACT OR A SIGNIFICANT LEGISLATIVE RULE. IF YOU
WRITING AND THEY MUST BE SENT TO	
Name: Ray Allshouse, Chair	
Agency: State Building Code Counc	
Address: PO Box 41449, Olympia V	VA 98504-1449
AND RECEIVED BY (Date) July 22, 2014	
Purpose of the proposal and its anticipated effects, including any cha	anges in existing rules:
Makes editorial changes to the following sections of the commercial	-
makes editorial changes to the following sections of the commercial	energy portion of the washington state Lifergy code.
See attached list	
Reasons supporting proposal:	
Some editorial errors were identified in the rules filed under WSR 13-04-056. The	is rule corrects those errors.
Statutory authority for adoption: RCW 19.27A.025, 19.27A.045	Statute being implemented: RCW 19.27, 19.27A and 34.05
Is rule necessary because of a:	CODE REVISER USE ONLY
Federal Law?	
State Court Decision?	
If yes, CITATION:	
DATE	
June 14, 2013 NAME (TYPE OR PRINT)	
C. Ray Allshouse	
SIGNATURE A.G. And	
SIGNATURE Chay Clarkene	
TITLE // Council Chair	

Name of proponent: (person or org	anization) State Building Code Council	☐ Private ☐ Public
		☐ Governmental
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Enforcement Local jurisdictions		()
Agency comments or recommend matters: None.	lations, if any, as to statutory language, implement	tation, enforcement, and fiscal

Purpose of the proposal and its anticipated effects, including any changes in existing rules:

- Makes editorial changes to the following sections of the commercial energy portion of the Washington State Energy Code, WAC 51-11C.
 - WAC 51-11C-10140 Section C101.4.2: This change makes a grammatical correction to improve the clarity of the requirement.
 - Section C101.4.4: This change, along with others throughout the code [402.1.3.1, 403.2.6.1, 407.5.2.3, Table C407.5.1(2)], replaces the term "residential" with "Group R" for better correlation within and between codes.
 - WAC-51-11C-10400 Section C104.2: This change improves the grammar of the section and clarifies the intent.
 - WAC-51-11C-40213 Section C402.1.3.1: This change replaces the term "residential" with "Group R" and "non-residential" to "Other than Group R" for consistency.
 - WAC-51-11C-40326 Section C403.2.6.1: This change replaces the term "residential" with "Group R".
 - Section C403.2.6.2: This change corrects a typographical error in the text to specify condensate water heat recovery is intended.
 - WAC-51-11C-40331 Section C403.3.1: The term "residential" is replaced with "Group R" in exceptions 1 and 3. VRF is removed from exception 3 as this should be referenced in the complex system requirements rather than those for simple systems. A new exception 5 is added to allow systems to comply through the use of exception 5 to Section C403.4.1. This was previously allowed under the 2009 WSEC.
 - **WAC-51-11C-40341 Section C403.4.1:** This change adds the VRF systems removed in the previous section to exception 4.
 - WAC-51-11C-40409 Section C404.9: This change makes an editorial correction to remove redundant language.
 - WAC-51-11C-40705 Section C407.5.2.3: This change replaces the term "residential" with "Group R".
 - WAC-51-11C-407052 Table C407.5.1(2): This change replaces the term "residential" with "Group R".
 - WAC-51-11C-610714 Table A107.1(1): Footnote c is removed from this table. The footnote applied to information removed from the table in 2009 and is now irrelevant.
 - WAC-51-11C-610714 Table A107.1(4): This change corrects acronyms for extruded and expanded polystyrene. In the early editions of ASHRAE 90.1, where this table originated, these acronyms were reversed; later editions corrected the error but it was not corrected in the WSEC.

AMENDATORY SECTION (Amending WSR 13-20-120, filed 10/1/13, effective 11/1/13)

WAC 51-11C-10140 Section C101.4-Applicability.

C101.4 Applicability. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

C101.4.1 Existing buildings. Except as specified in this chapter, this code shall not be used to require the removal, alteration or abandonment of, nor prevent the continued use and maintenance of, an existing building or building system lawfully in existence at the time of adoption of this code.

C101.4.2 Historic buildings. The building official may modify the specific requirements of this code for historic buildings and require ((in lieu of)) alternate ((requirements)) provisions which will result in a reasonable degree of energy efficiency. This modification may be allowed for those buildings or structures that are listed in the state or national register of historic places; designated as a historic property under local or state designation law or survey; certified as

a contributing resource with a national register listed or locally designated historic district; or with an opinion or certification that the property is eligible to be listed on the national or state registers of historic places either individually or as a contributing building to a historic district by the state historic preservation officer or the keeper of the national register of historic places. C101.4.3 Additions, alterations, renovations or repairs. Additions, alterations, renovations or repairs to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

EXCEPTION:

The following need not comply provided the energy use of the building is not increased: 1. Storm windows installed over existing fenestration.

^{2.} Glass only replacements in an existing sash and frame.

^{3.} Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are insulated to full depth with insulation having a minimum nominal value of R-3.0 per inch installed per Section C402.

4. Construction where the existing roof, wall or floor cavity is not exposed.

^{4.} Construction where the existing roof, wall or floor cavity is not exposed.

5. Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.

6. Replacement of existing doors that separate *conditioned space* from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a *conditioned space* from the exterior shall not be removed.

7. Alterations to lighting systems only that replace less than 60 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.

8. Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the *alteration* does not increase the installed interior lighting power.

increase the installed interior lighting power.

C101.4.3.1 Lighting and motors. Alterations that replace 60 percent or more of the luminaires in a space enclosed by walls or ceiling-height partitions shall comply with Section C405.5. Where less than 60 percent of the luminaires in a space enclosed by walls or ceilingheight partitions are new, the installed lighting wattage shall be maintained or reduced.

Alterations that replace 60 percent or more of the exterior luminaires shall comply with Section C405.6. Where less than 60 percent of the exterior luminaires are new, the installed lighting wattage shall be maintained or reduced.

Where new wiring is being installed to serve added fixtures and/or fixtures are being relocated to a new circuit, controls shall comply with Sections C405.2.1, C405.2.2.3, C405.2.3, C405.2.4, and as applicable C408.3. In addition, office areas less than 300 ft2 enclosed by walls or ceiling-height partitions, and all meeting and conference rooms, and all school classrooms, shall be equipped with occupancy sensors that comply with Section C405.2.2 and C408.3. Where a new lighting panel (or a moved lighting panel) with all new raceway and conductor wiring from the panel to the fixtures is being installed, controls shall also comply with the other requirements in Sections C405.2.2 and C408.3.

Where new walls or ceiling-height partitions are added to an existing space and create a new enclosed space, but the lighting fixtures are not being changed, other than being relocated, the new enclosed space shall have controls that comply with Sections C405.2.1, C405.2.2, C405.2.3 and C408.3.

Those motors which are altered or replaced shall comply with Section C403.2.13.

C101.4.3.2 Mechanical systems. Those parts of systems which are altered or replaced shall comply with Section C403. Additions or alterations shall not be made to an existing mechanical system that will cause the existing mechanical system to become out of compliance.

All new systems in existing buildings, including packaged unitary equipment and packaged split systems, shall comply with Section C403.

Where mechanical cooling is added to a space that was not previously cooled, the mechanical cooling system shall comply with the economizer requirements in Section C403.3.1 or C403.4.1.

EXCEPTION: Alternate designs that are not in full compliance with this code may be approved when the building official determines that existing building or occupancy constraints make full compliance impractical or where full compliance would be economically impractical.

Alterations to existing mechanical cooling systems shall not decrease economizer capacity unless the system complies with Section C403.3.1 or C403.4.1. In addition, for existing mechanical cooling systems that do not comply with Sections C403.3.1 or Section 403.4.1,

including both the individual unit size limits and the total building capacity limits on units without economizer, other alterations shall comply with Table C101.4.3.2.

When space cooling equipment is replaced, controls shall be installed to provide for integrated operation with economizer in accordance with Section C403.3.

Existing equipment currently in use may be relocated within the same floor or same tenant space if removed and reinstalled within the same permit.

C101.4.4 Change in occupancy or use. Spaces undergoing a change in occupancy from an F, S or U occupancy to an occupancy other than F, S or U shall comply with this code. Any space that is converted to a ((residential)) Group R dwelling unit or portion thereof, from another use or occupancy shall comply with this code. Where the use in a space changes from one use in Table C405.5.2 (1) or (2) to another use in Table C405.5.2 (1) or (2), the installed lighting wattage shall comply with Section C405.5.

Where the component performance building envelope option in Section C402.1.3 is used to comply with this section, the Proposed UA is allowed to be up to 110 percent of the Target UA. Where the total building performance option in Section C407 is used to comply with this section, the annual energy consumption of the proposed design is allowed to be 110 percent of the annual energy consumption otherwise allowed by Section C407.3 and Section C401.2 (3). EXCEPTION:

C101.4.5 Change in space conditioning. Any nonconditioned space that is altered to become conditioned space or semi-heated space shall be required to be brought into full compliance with this code. Any semiheated space that is altered to become conditioned space shall be required to be brought into full compliance with this code.

Where the component performance building envelope option in Section C402.1.3 is used to comply with this section, the Proposed UA is allowed to be up to 110 percent of the Target UA. Where the total building performance option in Section C407 is used to comply with this section, the annual energy consumption of the proposed design is allowed to be 110 percent of the annual energy consumption otherwise allowed by Section C407.3 and Section C401.2 (3). EXCEPTION:

C101.4.6 Mixed occupancy. Where a building includes both residential and commercial occupancies, each occupancy shall be separately considered and meet the applicable provisions of IECC-Commercial Provisions or IECC-Residential Provisions.

[Statutory Authority: RCW 19.27A.025, 19.27A.045, and 19.27.074. WSR 13-20-120, § 51-11C-10140, filed 10/1/13, effective 11/1/13. Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-10140, filed 2/1/13, effective 7/1/13.]

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-10400 Section C104-Inspections.

C104.1 General. Construction or work for which a permit is required shall be subject to inspection by the code official.

C104.2 Required approvals. Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the code official. The code official, upon notification, shall make the requested inspections and shall either indicate the portion of the construction that is satisfactory as completed, or notify the permit holder or his or her agent wherein the same fails to comply with this code. Any portions that do not comply shall be corrected and such portion shall not be covered or concealed until authorized by the code official. Where applicable, inspections shall include at least((÷)) the requirements in Sections C104.2.1 through C104.2.3.2.

C104.2.1 Envelope

- C104.2.1.1 Wall Insulation Inspection: To be made after all wall insulation and air vapor retarder sheet or film materials are in place, but before any wall covering is placed.
- C104.2.1.2 Glazing Inspection: To be made after glazing materials are installed in the building.
- C104.2.1.3 Exterior Roofing Insulation: To be made after the installation of the roof insulation, but before concealment.
- C104.2.1.4 Slab/Floor Insulation: To be made after the installation of
 the slab/floor insulation, but before concealment.

C104.2.2 Mechanical

- C104.2.2.1 Mechanical Equipment Efficiency and Economizer: To be made after all equipment and controls required by this code are installed and prior to the concealment of such equipment or controls.
- C104.2.2.2 Mechanical Pipe and Duct Insulation: To be made after all pipe and duct insulation is in place, but before concealment.

C104.2.3 Lighting and motors

- C104.2.3.1 Lighting Equipment and Controls: To be made after the installation of all lighting equipment and controls required by this code, but before concealment of the lighting equipment.
- C104.2.3.2 Motor Inspections: To be made after installation of all equipment covered by this code, but before concealment.
- C104.3 Final inspection. The building shall have a final inspection and not be occupied until approved.
- C104.4 Reinspection. A building shall be reinspected when determined necessary by the code official.
- C104.5 Approved inspection agencies. The code official is authorized to accept reports of approved inspection agencies, provided such agencies satisfy the requirements as to qualifications and reliability.

- C104.6 Inspection requests. It shall be the duty of the holder of the permit or their duly authorized agent to notify the code official when work is ready for inspection. It shall be the duty of the permit holder to provide access to and means for inspections of such work that are required by this code.
- C104.7 Reinspection and testing. Where any work or installation does not pass an initial test or inspection, the necessary corrections shall be made so as to achieve compliance with this code. The work or installation shall then be resubmitted to the code official for inspection and testing.
- C104.8 Approval. After the prescribed tests and inspections indicate that the work complies in all respects with this code, a notice of approval shall be issued by the code official.
- C104.8.1 Revocation. The code official is authorized to, in writing, suspend or revoke a notice of approval issued under the provisions of this code wherever the certificate is issued in error, or on the basis of incorrect information supplied, or where it is determined that the building or structure, premise, or portion thereof is in violation of any ordinance or regulation or any of the provisions of this code.

[Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, \S 51-11C-10400, filed 2/1/13, effective 7/1/13.]

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-40213 Section C402.1.3-Component performance option. C402.1.3 Component performance building envelope option.

C402.1.3.1 General. Buildings or structures whose design heat loss rate (UA_p) and solar heat gain coefficient rate (SHGC * A_p) are less than or equal to the target heat loss rate (UA_t) and solar heat gain coefficient rate (SHGC * A_t) shall be considered in compliance with this section. The stated *U*-factor, *F*-factor or allowable area of any component assembly, listed in Table C402.1.2 and Table C402.3, such as roof/ceiling, opaque wall, opaque door, fenestration, floor over conditioned space, slab-on-grade floor, radiant floor or opaque floor may be increased and the *U*-factor or *F*-factor for other components decreased, provided that the total heat gain or loss for the entire building envelope does not exceed the total resulting from compliance to the *U*-factors, *F*-factors or allowable areas specified in this

section. Compliance shall be calculated in total for the building envelope for ((nonresidential)) other than Group R spaces and for ((residential)) Group R spaces.

C402.1.3.2 Component U-factors. The U-factors for typical construction assemblies are included in Chapter 3 and Appendix A. These values shall be used for all calculations. Where proposed construction assemblies are not represented in Chapter 3 or Appendix A, values shall be calculated in accordance with the ASHRAE Handbook-Fundamentals, using the framing factors listed in Appendix A.

For envelope assemblies containing metal framing, the U-factor shall be determined by one of the following methods:

- 1. Results of laboratory measurements according to acceptable methods of test.
- 2. ASHRAE Handbook-Fundamentals where the metal framing is bonded on one or both sides to a metal skin or covering.
 - 3. The zone method as provided in ASHRAE Handbook-Fundamentals.
 - 4. Effective framing/cavity R-values as provided in Appendix A.

When return air ceiling plenums are employed, the roof/ceiling assembly shall:

a. For thermal transmittance purposes, not include the ceiling proper nor the plenum space as part of the assembly; and

- b. For gross area purposes, be based upon the interior face of the upper plenum surface.
 - 5. Tables in ASHRAE 90.1-2010 Normative Appendix A.
- ${\tt C402.1.3.3}$ UA calculations. The target UA, and the proposed UA, shall be calculated using Equations C402-1 and C402-2 and the corresponding areas and U-factors from Table C402.1.2 and Table C402.3. For the target UA_t calculation, the skylights shall be located in roof/ceiling area up to the maximum skylight area per Section C402.3.1 and the remainder of the fenestration allowed per Section C402.3.1 shall be located in the wall area.
- C402.1.3.4 SHGC rate calculations. Solar heat gain coefficient shall comply with Table C402.3. The target $SHGCA_t$ and the proposed $SHGCA_D$ shall be calculated using Equations C402-3 and C402-4 and the corresponding areas and SHGCs from Table C402.3.

[Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, \$51-11C-40213, filed 2/1/13, effective 7/1/13.]

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-40326 Section C403.2.6-Energy recovery.

C403.2.6 Energy recovery.

C403.2.6.1 Energy recovery ventilation systems. Any system with minimum outside air requirements at design conditions greater than 5,000 CFM or any system required by Table C403.2.6 shall include an energy recovery system. The energy recovery system shall have the capability to provide a change in the enthalpy of the outdoor air supply of not less than 50 percent of the difference between the outdoor air and return air enthalpies, at design conditions. Where an air economizer is required, the energy recovery system shall include a bypass or controls which permit operation of the economizer as required by Section C403.4. Where a single room or space is supplied by multiple units, the aggregate ventilation (cfm) of those units shall be used in applying this requirement.

EXCEPTION:

An energy recovery ventilation system shall not be required in any of the following conditions:

^{1.} Where energy recovery systems are prohibited by the *International Mechanical Code*.

2. Laboratory fume hood systems that include at least one of the following features:

^{2.1.} Variable-air-volume hood exhaust and room supply systems capable of reducing exhaust and makeup air volume to 50 percent or

^{2.2.} Direct makeup (auxiliary) air supply equal to at least 75 percent of the exhaust rate, heated no warmer than 2°F (1.1°C) above room setpoint, cooled to no cooler than 3°F (1.7°C) below room setpoint, no humidification added, and no simultaneous heating and cooling used for dehumidification control.

used for dendination control.

3. Systems serving spaces that are heated to less than 60°F (15.5°C) and are not cooled.

4. Where more than 60 percent of the outdoor heating energy is provided from site-recovered or site solar energy.

5. Heating energy recovery in Climate Zones 1 and 2.

6. Cooling energy recovery in Climate Zones 3C, 4C, 5B, 5C, 6B, 7 and 8.

^{7.} Systems requiring dehumidification that employ energy recovery in series with the cooling coil.

8. Multi-zone systems with cold deck supply air and zone reheat where the minimum outdoor air is less than 70 percent of total supply

air.

9. Systems serving ((residential multifamily spaces)) Group R dwelling or sleeping units where the largest source of air exhausted at a single location at the building exterior is less than 25 percent of the design outdoor air flow rate.

C403.2.6.2 Condensate systems. On-site steam heating systems shall have condensate water heat recovery. On-site includes a system that is located within or adjacent to one or more buildings within the boundary of a contiguous area or campus under one ownership and which serves one or more of those buildings.

Buildings using steam generated off-site with steam heating systems which do not have condensate water recovery shall have condensate water heat recovery.

C403.2.6.3 Condenser heat recovery. Facilities having food service, meat or deli departments and having 500,000 Btu/h or greater of remote refrigeration condensers shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, space heating or for dehumidification reheat. Facilities having a gross conditioned floor area of 40,000 ft² or greater and 1,000,000 Btu/h or greater of remote refrigeration shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, and either for space heating or for dehumidification reheat for maintaining low space humidity.

[Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, \$51-11C-40326, filed 2/1/13, effective 7/1/13.1

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-40331 Section C403.3.1-Economizers.

C403.3.1 Economizers. Each cooling system that has a fan shall include an air economizer meeting the requirements of Sections C403.3.1.1 through C403.3.1.1.4.

EXCEPTION:

Economizers are not required for the systems listed below:

2. Systems with dehumidification that affect other systems so as to increase the overall building energy consumption. New humidification equipment shall comply with Section C403.2.3.4.

4. Where the cooling *efficiency* meets or exceeds the *efficiency* requirements in Table C403.3.1(2).

Table C403.3.1(2)

Equipment Efficiency Performance

Exception for Economizers

Climate Zones	Cooling Equipment Performance Improvement (EER OR IPLV)
2B	10% Efficiency Improvement
3B	15% Efficiency Improvement
4B	20% Efficiency Improvement

C403.3.1.1 Air economizers. Air economizers shall comply with Sections C403.3.1.1.1 through C403.3.1.1.4.

^{1.} Qualifying small equipment: This exception shall not be used for unitary cooling equipment installed outdoors or in a mechanical 1. Qualifying small equipment: This exception shall not be used for unitary cooling equipment installed outdoors or in a mechanical room adjacent to the outdoors. This exception is allowed to be used for other cooling units and split systems with a total cooling capacity rated in accordance with Section C403.2.3 of less than 33,000 Btu/h (hereafter referred to as qualifying small systems) provided that these are high-efficiency cooling equipment with SEER and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.2.3 (1) through (3), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all qualifying small equipment without economizers shall not exceed 72,000 Btu/h per building, or 5 percent of its air economizer capacity, whichever is greater. That portion of the equipment serving ((residential)) Group R occupancies is not included in determining the total capacity of all units without economizers in a building. Redundant units are not counted in the capacity limitations. This exception shall not be used for the shell-and-core permit or for the initial tenant improvement or for Total Building Performance.

2. Systems with debumidification that affect other systems on as to increase the overall building energy consumption. New

^{3.} For ((residential)) Group R occupancies, cooling units installed outdoors or in a mechanical room adjacent to outdoors with a total cooling capacity less than 20,000 Btu/h and other cooling units with a total cooling capacity less than 54,000 Btu/h provided that these are high-efficiency cooling equipment with IEER, SEER, and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.2.3 (1) through (10), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. For split systems ((and VRF systems)), compliance is based on the cooling capacity of individual fan coil units.

^{5.} Equipment used to cool any dedicated server room, electronic equipment room or telecom switch room provided the system complies with Exception 5 of Section C403.4.1. The total allowance for equipment utilizing Exception 5 of Section C403.4.1 includes the sum of both simple and complex systems.

C403.3.1.1.1 Design capacity. Air economizer systems shall be capable of modulating outdoor air and return air dampers to provide up to 100 percent of the design supply air quantity as outdoor air for cooling. C403.3.1.1.2 Control signal. Economizer dampers shall be capable of being sequenced with the mechanical cooling equipment and shall not be controlled by only mixed air temperature. Air economizers on systems with cooling capacity greater than 65,000 Btu/h shall be capable of providing partial cooling even when additional mechanical cooling is required to meet the remainder of the cooling load.

The use of mixed air temperature limit control shall be permitted for systems that are both controlled from space temperature (such as single *zone* systems) and having cooling capacity less than 65,000 Btu/h. EXCEPTION:

C403.3.1.1.3 High-limit shutoff. Air economizers shall be capable of automatically reducing outdoor air intake to the design minimum outdoor air quantity when outdoor air intake will no longer reduce cooling energy usage. High-limit shutoff control types for specific climates shall be chosen from Table C403.3.1.1.3(1). High-limit shutoff control settings for these control types shall be those specified in Table C403.3.1.1.3(2).

C403.3.1.1.4 Relief of excess outdoor air. Systems shall be capable of relieving excess outdoor air during air economizer operation to prevent over-pressurizing the building. The relief air outlet shall be located to avoid recirculation into the building.

[Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-40331, filed 2/1/13, effective 7/1/13.]

AMENDATORY SECTION (Amending WSR 13-20-120, filed 10/1/13, effective 11/1/13)

WAC 51-11C-40341 Section C403.4.1-Economizers.

C403.4.1 Economizers. Air economizers shall be provided on all new systems including those serving computer server rooms, electronic equipment, radio equipment, and telephone switchgear. Economizers shall comply with Sections C403.4.1.1 through C403.4.1.4.

EXCEPTIONS:

- 1. Water-cooled refrigeration equipment serving chilled beams and chilled ceiling space cooling systems only which are provided with a water economizer meeting the requirements of Section C403.4.1.1 through C403.4.1.4. Water economizer capacity per building shall not exceed 500 tons. This exception shall not be used for Total Building Performance.

- not exceed 500 tons. This exception shall not be used for 1 otal Building Performance.

 2. Systems complying with all of the following criteria:

 2.1. Consist of multiple water source heat pumps connected to a common water loop;

 2.2. Have a minimum of 60 percent air economizer;

 2.3. Have water source heat pumps with an EER at least 15 percent higher for cooling and a COP at least 15 percent higher for heating than that specified in Section C403.2.3;

 2.4. Where provided, have a central boiler or furnace efficiency of 90 percent minimum for units up to 199,000 Btu/h; and

 2.5. Provide heat recovery with a minimum 50 percent heat recovery effectiveness as defined in Section C403.2.6 to preheat the outside
- 2.5. Provide heat recovery with a minimum 50 percent heat recovery effectiveness as defined in Section Crossian supply.

 3. Chilled water terminal units connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than minimum part load efficiencies listed in Table C403.2.3(7), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all systems without economizers shall not exceed 480,000 Btu/h per building, or 20 percent of its air economizer capacity, whichever is greater. That portion of the equipment serving Group R Occupancy is not included in determining the total capacity of all units without economizers in a building. This exception shall not be used for the initial permit (this includes any initial permit for the space including, but not limited to, the shell-and-core permit, built-to-suit permit, and tenant improvement permit) or for Total Building Performance Method.

 4. For Group R occupancies, cooling units installed outdoors or in a mechanical room adjacent to outdoors with a total cooling capacity less than 20,000 Btu/h and other cooling units with a total cooling capacity less than 54,000 Btu/h provided that these are high-efficiency cooling equipment with SEER and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.2.3 (1) through (3), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. For split systems and VRF systems, compliance is based on the cooling capacity of individual fan coil units.
- individual fan coil units.

 5. Equipment used to cool any dedicated server room, electronic equipment room or telecom switch room provided that they completely comply with Option a, b, or c in the table below. The total capacity of all systems without economizers shall not exceed 240,000 Btu/h per building or 10 percent of its air economizer capacity, whichever is greater. This exception shall not be used for Total Building Performance.

	Equipment Type	Higher Equipment Efficiency	Part-Load Control	Economizer
Option a	Tables C403.2.3(1) and C403.2.3(2) ^a	+15% ^b	Required over 85,000 Btu/h ^c	None Required
Option b	Tables C403.2.3(1) and C403.2.3(2) ^a	+5% ^d	Required over 85,000 Btu/h ^c	Waterside Economizer ^e
Option c	ASHRAE Standard 127 ^f	+0% ^g	Required over 85,000 Btu/h ^c	Waterside Economizer ^e

Notes for Exception 5:

- For a system where all of the cooling equipment is subject to the AHRI standards listed in Tables C403.2.3(1) and C403.2.3(2), the system shall comply with all of the following (note that if the system contains any cooling equipment that exceeds the capacity limits in Table C403.2.3(1) or C403.2.3(2), or if the system contains any cooling equipment that is not included in Table C403.2.3(1) or C403.2.3(2), then the system is not allowed to use this option).
- allowed to use this option). The cooling equipment shall have an EER value and an IPLV value that is a minimum of 15 percent greater than the value listed in Tables C403.2.3(1) and C403.2.3(2) (1.15 x values in Tables C403.2.3(1) and C403.2.3(2)). For units with a total cooling capacity over 85,000 Btu/h, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50 percent of the load or less that results in the compressor operating at the same or higher EER at part loads than at full load (e.g., minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, dual tandem scrolls, but hot gas bypass is not credited as a compressor unloading system). The cooling equipment shall have an EER value and an IPLV value that is a minimum of 5 percent greater than the value listed in Tables C403.2.3(1) and C403.2.3(2) (1.05 x values in Tables C403.2.3(1) and C403.2.3(2)).
- The system shall include a water economizer in lieu of air economizer. Water economizers shall meet the requirements of C403.4.1.2 through C403.4.1.4 and be capable of providing the total concurrent cooling load served by the connected terminal equipment lacking airside economizer, at outside air temperatures of 50°F dry-bulb/45°F wet-bulb and below. For this calculation, all factors including solar and internal load shall be the same as those used for peak load calculations, except for the outside temperatures. The equipment shall be served by a dedicated condenser water system unless a nondedicated condenser water system exists that can provide appropriate water temperatures during hours when waterside economizer cooling is available.
- For a system where all cooling equipment is subject to ASHRAE Standard 127.

 The cooling equipment subject to the ASHRAE Standard 127 shall have an EER value and an IPLV value that is equal or greater than the value listed in Tables C403.2.3(1) and C403.2.3(2) when determined in accordance with the rating conditions ASHRAE Standard 127 (i.e., not the rating conditions in AHRI Standard 210/240 or 340/360). This information shall be provided by an independent third party.
 - 6. Variable refrigerant flow (VRF) systems, multiple-zone split-system heat pumps, consisting of multiple, individually metered indoor units with multi-speed fan motors, served on a single common refrigeration circuit with an exterior reverse-cycle heat pump with variable speed compressor(s) and variable speed condenser fan(s). These systems shall also be capable of providing simultaneous heating and cooling operation, where recovered energy from the indoor units operating in one mode can be transferred to one or more indoor units operating in the other mode, and shall serve at least 20 percent internal (no perimeter wall within 12') and 20 percent perimeter zones (as determined by conditioned floor area) and the outdoor unit shall be at least 65,000 Btu/h in total capacity. Systems utilizing this exception shall have 50 percent heat recovery effectiveness as defined by Section C403.2.6 on the outside air. For the purposes of this exception, dedicated server rooms, electronic equipment rooms or telecom switch rooms are not considered perimeter zones. This exception shall be limited to buildings of 60,000 square feet and less.
- C403.4.1.1 Design capacity. Water economizer systems shall be capable of cooling supply air by indirect evaporation and providing up to 100 percent of the expected system cooling load at outdoor air temperatures of 50°F dry-bulb (10°C dry-bulb)/45°F wet-bulb (7.2°C wet-bulb) and below.

Systems in which a water economizer is used and where dehumidification requirements cannot be met using outdoor air temperatures of $50^{\circ}F$ dry-bulb ($10^{\circ}C$ dry-bulb)/ $45^{\circ}F$ wet-bulb ($7.2^{\circ}C$ wet-bulb) shall satisfy 100 percent of the expected system cooling load at $45^{\circ}F$ EXCEPTION: dry-bulb (7.2°C dry-bulb)/40°F wet-bulb (4.5°C wet-bulb).

C403.4.1.2 Maximum pressure drop. Precooling coils and water-to-water heat exchangers used as part of a water economizer system shall either have a waterside pressure drop of less than 15 feet (4572 mm) of water or a secondary loop shall be created so that the coil or heat exchanger pressure drop is not seen by the circulating pumps when the system is in the normal cooling (noneconomizer) mode.

C403.4.1.3 Integrated economizer control. Economizer systems shall be integrated with the mechanical cooling system and be capable of providing partial cooling even where additional mechanical cooling is required to meet the remainder of the cooling load.

EXCEPTIONS: 1. Direct expansion systems that include controls that reduce the quantity of outdoor air required to prevent coil frosting at the lowest step of compressor unloading, provided this lowest step is no greater than 25 percent of the total system capacity.

2. Individual direct expansion units that have a rated cooling capacity less than 54,000 Btu/h (15,827 W) and use nonintegrated economizer controls that preclude simultaneous operation of the economizer and mechanical cooling.

C403.4.1.4 Economizer heating system impact. HVAC system design and economizer controls shall be such that economizer operation does not increase the building heating energy use during normal operation. EXCEPTION:

[Statutory Authority: RCW 19.27A.025, 19.27A.045, and 19.27.074. WSR 13-20-120, § 51-11C-40341, filed 10/1/13, effective 11/1/13. Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-40341, filed 2/1/13, effective 7/1/13.]

Economizers on VAV systems that cause zone level heating to increase due to a reduction in supply air temperature.

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-40409 Section C404.9-Domestic hot water meters. C404.9 Domestic hot water meters. Each individual dwelling unit in a Group R-2 ((multi-family residential)) occupancy with central service shall be provided with a domestic hot water meter to allow for domestic hot water billing based on actual domestic hot water usage. [Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, \$51-11C-40409, filed 2/1/13, effective 7/1/13.1

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-40705 Section C407.5-Calculation procedure.

C407.5 Calculation procedure. Except as specified by this section, the standard reference design and proposed design shall be configured and analyzed using identical methods and techniques.

C407.5.1 Building specifications. The standard reference design and proposed design shall be configured and analyzed as specified by Table C407.5.1(1). Table C407.5.1(1) shall include by reference all notes contained in Table C402.2.

C407.5.2 Thermal blocks. The standard reference design and proposed design shall be analyzed using identical thermal blocks as specified in Section C407.5.2.1, C407.5.2.2 or C407.5.2.3.

C407.5.2.1 HVAC zones designed. Where HVAC zones are defined on HVAC design drawings, each HVAC zone shall be modeled as a separate thermal block.

EXCEPTION:

Different HVAC zones shall be allowed to be combined to create a single thermal block or identical thermal blocks to which multipliers

are applied provided.

1. The space use classification is the same throughout the thermal block.

2. All HVAC *zones* in the thermal block that are adjacent to glazed exterior walls face the same orientation or their orientations are within 45 degrees (0.79 rad) of each other.

3. All of the *zones* are served by the same HVAC system or by the same kind of HVAC system.

- C407.5.2.2 HVAC zones not designed. Where HVAC zones have not yet been designed, thermal blocks shall be defined based on similar internal load densities, occupancy, lighting, thermal and temperature schedules, and in combination with the following quidelines:
- 1. Separate thermal blocks shall be assumed for interior and perimeter spaces. Interior spaces shall be those located more than 15 feet (4572 mm) from an exterior wall. Perimeter spaces shall be those located closer than 15 feet (4572 mm) from an exterior wall.
- 2. Separate thermal blocks shall be assumed for spaces adjacent to glazed exterior walls: A separate zone shall be provided for each orientation, except orientations that differ by no more than 45 degrees (0.79 rad) shall be permitted to be considered to be the same orientation. Each zone shall include floor area that is 15 feet (4572 mm) or less from a glazed perimeter wall, except that floor area within 15 feet (4572 mm) of glazed perimeter walls having more than one orientation shall be divided proportionately between zones.

- 3. Separate thermal blocks shall be assumed for spaces having floors that are in contact with the ground or exposed to ambient conditions from zones that do not share these features.
- 4. Separate thermal blocks shall be assumed for spaces having exterior ceiling or roof assemblies from zones that do not share these features.

C407.5.2.3 Multifamily ((residential)) Group R buildings.

((Residential)) Group R spaces shall be modeled using one thermal block per space except that those facing the same orientations are permitted to be combined into one thermal block. Corner units and units with roof or floor loads shall only be combined with units sharing these features.

[Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, \$51-11C-40705, filed 2/1/13, effective 7/1/13.]

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-407052 Table C407.5.1(2)-HVAC systems map.

Table C407.5.1(2)

HVAC Systems Map

		Standard Reference Design HVAC System Type ^c			
Condenser Cooling Source	Heating System Classification ^b	Single-Zone ((Residential)) <u>Group R</u> System	Single-Zone ((Nonresidential)) Other than Group R System	All Other	
	Electric resistance	System 5	System 5	System 1	
Water/ground	Heat pump	System 6	System 6	System 6	
	Fossil fuel	System 7	System 7	System 2	
	Electric resistance	System 8	System 9	System 3	
Air/none	Heat pump	System 8	System 9	System 3	
	Fossil fuel	System 10	System 11	System 4	

Select "water/ground" if the proposed design system condenser is water or evaporatively cooled; select "air/none" if the condenser is air cooled. Closed-circuit dry coolers shall be considered air cooled. Systems utilizing district cooling shall be treated as if the condenser water type were "water." If no mechanical cooling is specified or the mechanical cooling system in the proposed design does not require heat rejection, the system shall be treated as if the condenser water type were "Air." For proposed designs with ground-source or groundwater-source heat pumps, the standard reference design HVAC system shall be water-source heat pump (System 6). ((Select the path that corresponds to the proposed design heat source: Electric resistance, heat pump (including air source and water source), or fuel fired. Systems utilizing district heating (steam or hot water) and systems with no heating capability shall be treated as if the heating system type were "fossil fuel.")) Systems utilizing district heating (steam or hot water) or district cooling and systems with no heating capability shall be treated as if the heating system type were "fossil fuel" for the purpose of Standard Reference Design HVAC system selection. Otherwise, select the path that corresponds to the proposed design heat source: Electric resistance, heat pump (including air source and water source), or fuel fired. For systems with mixed fuel heating sources, the system or systems that use the secondary heating source type (the one with the smallest total installed output capacity for the spaces served by the system) shall be modeled identically in the standard reference design and the primary heating source type shall be used to determine standard reference design HVAC system type.

determine standard reference design HVAC system type.

Select the standard reference design HVAC system type.

Select the standard reference design HVAC system category: The system under "single-zone ((residential))) Group R system" shall be selected if the HVAC system in the proposed design is a single-zone system and serves a residential space. The system under "single-zone ((nonresidential)) other than Group R system" shall be selected if the HVAC system in the proposed design is a single-zone system and serves other than ((residential)) Group R spaces. The system under "all other" shall be selected for all other cases.

[Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, \$51-11C-407052, filed 2/1/13, effective 7/1/13.]

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11R-610711 Table A107.1(1)—Default door U-factors.

TABLE A107.1(1)

DEFAULT DOOR U-FACTORS

Door Type	No Glazed Fenestratio n	Single Glazing	Double Glazing with 1/4 in. Airspace	Double Glazing with 1/2 in. Airspac e	Double Glazing with e = 0.10 1/2 in. Argon
SWINGING DOORS	(Rough openi	ng - 38 in.	x 82 in.)		
Slab Doors					
Wood slab in wood frame ^a	0.46				
6% glazed fenestration (22 in. x 8 in. lite)	-	0.48	0.47	0.46	0.44
25% glazed fenestration (22 in. x 36 in. lite)	-	0.58	0.48	0.46	0.42
45% glazed fenestration (22 in. x 64 in. lite)	-	0.69	0.49	0.46	0.39
More than 50% glazed fenestration	Use Table R303.1.3(1)				
Insulated steel slab with wood edge in wood frame ^a	0.16				
6% glazed fenestration (22 in. x 8 in. lite)	-	0.21	0.20	0.19	0.18
25% glazed fenestration (22 in. x 36 in. lite)	-	0.39	0.28	0.26	0.23
45% glazed fenestration (22 in. x 64 in. lite)	-	0.58	0.38	0.35	0.26

Door Type	No Glazed Fenestratio n	Single Glazing	Double Glazing with 1/4 in. Airspace	Double Glazing with 1/2 in. Airspac e	Double Glazing with e = 0.10 ', 1/2 in. Argon
More than 50% glazed fenestration		Use Ta	able R303.1.3	(1)	
Foam insulated steel slab with metal edge in steel frame ^b	0.37				
6% glazed fenestration (22 in. x 8 in. lite)	-	0.44	0.42	0.41	0.39
25% glazed fenestration (22 in. x 36 in. lite)	-	0.55	0.50	0.48	0.44
45% glazed fenestration (22 in. x 64 in. lite)	-	0.71	0.59	0.56	0.48
More than 50% glazed fenestration	Use Table R303.1.3(1)				
Cardboard honeycomb slab with metal edge in steel frame ^b	0.61				
Style and Rail Doors	•				
Sliding glass doors/French doors	Use Table R303.1.3(1)				
Site-Assembled Style and Rail Doors					
Aluminum in aluminum frame	-	1.32	0.99	0.93	0.79
Aluminum in aluminum frame with thermal break	-	1.13	0.80	0.74	0.63

Note:

[Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, \$ 51-11C-610714, filed 2/1/13, effective 7/1/13.]

Appendix A Tables A107.1(2) through A107.1(4) may also be used if applicable. Thermally broken sill (add 0.03 for nonthermally broken sill).

Nonthermally broken sill.

Nominal U-factors are through the center of the insulated panel before consideration of thermal bridges around the edges of the door section and due to the frame.))

AMENDATORY SECTION (Amending WSR 13-04-056, filed 2/1/13, effective 7/1/13)

WAC 51-11C-610714 Table A107.1(4)-Default U-factors for steel garage and hangar doors.

Table A107.1(4) Default U-factors for Steel Garage and Hangar Doors

Double-skin Steel Garage and Aircraft Hangar Doors						
	One-piece tilt-up ^a Sectional tilt-up ^b		Aircraft hangar			
Insulation ^e	8 ft. x 7 ft.	16 ft. x 7 ft.	9 ft. x 7 ft.	72 ft. x 12 ft.°	240 ft. x 50 ft.d	
1-3/8 in. thickness ((EPS)) XPS, steel ribs ((XPS)) EPS, steel ribs	0.36 0.33	0.33 0.31	0.34 - 0.39 0.31 - 0.36			
2 in. thickness ((EPS)) XPS, steel ribs ((XPS)) EPS, steel ribs	0.31 0.29	0.28 0.26	0.29 - 0.33 0.27 - 0.31			
3 in. thickness ((EPS)) XPS, steel ribs ((XPS)) EPS, steel ribs	0.26 0.24	0.23 0.21	0.25 - 0.28 0.24 - 0.27			
4 in. thickness ((EPS)) XPS, steel ribs ((XPS)) EPS, steel ribs	0.23 0.21	0.20 0.19	0.23 - 0.25 0.21 - 0.24			
6 in. thickness ((EPS)) XPS, steel ribs ((XPS)) EPS, steel ribs	0.20 0.19	0.16 0.15	0.20 - 0.21 0.19 - 0.21			
4 in. thickness Noninsulated Expanded polystyrene Mineral wool, steel ribs Extruded polystyrene				1.10 0.25 0.25 0.23	1.23 0.16 0.16 0.15	
6 in. thickness Noninsulated Expanded polystyrene Mineral wool, steel ribs Extruded polystyrene				1.10 0.21 0.23 0.20	1.23 0.13 0.13 0.12	
Uninsulated All products	1.15					

[Statutory Authority: RCW 19.27A.020, 19.27A.025 and chapters 19.27 and 34.05 RCW. WSR 13-04-056, § 51-11C-610714, filed 2/1/13, effective 7/1/13.]

Values are for thermally broken or thermally unbroken doors.
Lower values are for thermally broken doors; upper values are for doors with no thermal break. Typical size for a small private airplane (single-engine or twin). Typical hangar door for a midsize commercial jet airliner. ((EPS)) XPS is extruded polystyrene, ((XPS)) EPS is expanded polystyrene.